

REMARKS

Claims 1-18 are all the claims presently pending in the application. Claims 1-2, 4-5, 7-8, and 10-14 are amended to more clearly define the invention and claims 15-18 are added. Claims 1, 8, 10, and 14 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Claims 1-6 and 8-14 stand rejected under 35 U.S.C. § 102(e) as being anticipated by the Matsumoto et al. reference. Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Matsumoto et al. reference.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as defined by, for example, independent claim 1, is directed to a stereoscopic image processing apparatus for calculating a parallax between a pair of images that includes correlation evaluating means for evaluating a correlation of brightness between a first pixel block provided in one of the pair of images and a second pixel block provided in the other of the pair of images and region size changing means for changing a size of the first and second pixel blocks in evaluating said correlation.

Conventional stereoscopic parallax calculating systems and methods have preferred very large pixel block areas. However, large pixel blocks increase the likelihood that a target pixel block deviates because the position chosen is largely affected by large brightness changes. This is especially true for objects such as the ground and roads, which has a serious adverse affect and results in erroneous recognition.

Additionally, adverse weather conditions provide for a weaker contrast. This can be improved by providing a pixel block area having a small size. However, this has not been recognized by the conventional systems and the pixel block sizes for conventional systems have not changed.

In stark contrast, the present invention provides a region size changing means that changes the size of first and second pixel blocks that are used for evaluating a correlation in

brightness. In this manner, the present invention enhances the reliability, accuracy, and precision of stereoscopic parallax calculations.

II. THE 35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

The Examiner alleges that claims 1-14 are indefinite. While Applicant submits that such would be clear to one of ordinary skill in the art to allow them to know the metes and bounds of the invention, taking the present Application as a whole, to speed prosecution claims 1-2, 4-5, 7-8, and 10-14 have been amended in accordance with Examiner Schaffer's very helpful suggestions.

In view of the foregoing, the Examiner is respectfully requested to withdraw this rejection.

III. THE PRIOR ART REJECTIONS

The Examiner alleges that the Matsumoto et al. reference teaches the claimed invention and/or that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Matsumoto et al. reference to provide the claimed invention. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by the Matsumoto et al. reference and that it would not have been obvious to modify the Matsumoto et al. reference to arrive at the claimed invention.

The Matsumoto et al. reference does not teach or suggest the features of the claimed invention including: 1) region size changing means for changing a size of first and second pixel blocks that are used in evaluating a correlation of brightness (claim 1); 2) weighting factor changing means for changing the weighting factor that is used by a correlation evaluating means that evaluates a correlation of brightness (claim 8); 3) changing a size of first and second pixel blocks that are used for evaluating a correlation of brightness (claim 10); and 4) changing a weighting factor for evaluating a correlation of brightness (claim 14). As explained above, these features are important for enhancing the reliability, accuracy, and precision of stereoscopic parallax calculations.

Indeed, the Matsumoto et al. reference does not even teach or suggest any parallax calculating system or method at all, let alone a system or method which evaluates a correlation of brightness between a first pixel block in a first image and a second pixel block in a second image.

Rather, and in stark contrast, the Matsumoto et al. reference discloses a method and system for converting a two-dimensional motion image into a three-dimensional motion image and vice-versa. In particular, the Matsumoto et al. reference discloses receiving a two-dimensional image that is obtained by a monocular camera and creating a pseudo-three-dimensional image which simulates a three-dimensional image obtained by a multi-eye camera and vice-versa.

The Examiner alleges that the pixel blocks BLOCK 1 and BLOCK 2 in Figure 7 of the Matsumoto et al. reference corresponds to the claimed pixel blocks by referring the Applicant to paragraphs [0112] - [0116]. In particular, paragraphs [0112] - [0116] describe a calculation of a non-similarity in a corresponding point candidate area of step S 12 of Figure 5 ([0104]). The Matsumoto et al. reference discloses comparing BLOCK 1 that is taken at a first designated time and BLOCK 2 that is taken at a second designate time and gradually changing the position of the blocks within a selected candidate area and obtaining a value E1 that is the squared differences of gray levels. In this manner, the Matsumoto et al. reference determines a point Q in the second candidate area that corresponds with the point P in the first candidate area.

Paragraphs [0113] - [0115] of the Matsumoto et al. reference explains that the step of calculating a non-similarity in a corresponding point candidate area ([0104]) may be modified to determine the difference in red, green, and blue colors and that the nine pixel block may be increased to include more pixels, for example, to a sixteen pixel block. (Applicant notes that the Examiner appears to refer to a 9 x 9 pixel block and/or 16 x 16 pixel block, however, the Matsumoto et al. reference clearly does not disclose pixel blocks of that size.)

Paragraph [0116] merely states that step S 13 determines an initial position of a corresponding point and provides no description at all about how that is accomplished, let alone provide any support for the Examiner's allegation that the Matsumoto et al. reference discloses evaluating a correlation of brightness between pixel blocks.

Additionally, paragraphs [0112]-[0116] of the Matsumoto et al. reference as cited by the Examiner form a portion of the description of Embodiment 1 ([0081]) which receives an image on a monocular camera (two-dimensional image) and creates a pseudo-three-dimensional image which simulates an image received on a multi-eye camera ([0081]).

The Examiner then refers to paragraphs [0307]-[0308] and [0323] in an attempt to support the Examiner's allegation that the Matsumoto et al. reference discloses altering the

size of the pixel blocks.

Firstly, as very clearly explained by the Matsumoto et al. reference at [0304], the Examiner's citation of paragraphs [0307]-[0308] and [0323] describe an Embodiment 5 which is completely different from Embodiment 1 which corresponds to the Examiner's citation of paragraphs [0112]-[0116]. Embodiment 1 outputs an image for a three-dimensional display while Embodiment 5 outputs an image for a two-dimensional display. The description provided by the paragraphs [0112]-[0116] of Embodiment 5 illustrates steps performed upon a three-dimensional image in order to output a two-dimensional image.

Secondly, the Examiner's cited reference to paragraphs [0307]-[0308] and [0323] of the Matsumoto et al. reference have absolutely nothing at all to do with the pixel blocks BLOCK 1 and BLOCK 2 of the first embodiment which is used to determine a potential correspondence between points on images.

Indeed, paragraphs [0307]-[0308] and [0323] of the Matsumoto et al. reference do not mention anything that is even remotely related to these pixel blocks.

Rather, paragraphs [0307]-[0308] and [0323] of the Matsumoto et al. reference describe partial scaling of a portion of an image. Paragraphs [0307]-[0308] and [0323] of the Matsumoto et al. reference describe how, for example, the stick figure in the original viewfinder image of Figure 29 may be magnified such that the stick figure is larger in the magnified viewfinder image of Figure 31.

Paragraphs [0307]-[0308] and [0323] of the Matsumoto et al. reference do not teach or suggest any pixel blocks at all, let alone altering the size of any pixel blocks, or that the size of the pixel blocks that are used to determine a corresponding point in a second two-dimensional image as is described by the Examiner's cited portion of paragraphs [0113] - [0116] have anything at all to do with partial scaling of an image as described by paragraphs [0307]-[0308] and [0323] of the Matsumoto et al. reference.

Clearly, these are completely different and completely unrelated teachings.

The Matsumoto et al. reference clearly does not teach or suggest the features of the claimed invention including: 1) region size changing means for changing a size of first and second pixel blocks that are used in evaluating a correlation of brightness (claim 1); 2) weighting factor changing means for changing the weighting factor that is used by a correlation evaluating means that evaluates a correlation of brightness (claim 8); 3) changing a size of first and second pixel blocks that are used for evaluating a correlation of brightness

(claim 10); and 4) changing a weighting factor for evaluating a correlation of brightness (claim 14).

Therefore, the Matsumoto et al. reference does not teach or suggest each and every element of the claimed invention and the Examiner is respectfully requested to withdraw these rejections of claims 1-14.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-18, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Date: _____

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Respectfully Submitted,



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